

## **Drawings**

1. Fig 1, 19, 31 have had their corresponding reference numerals added and replacement sheets are labeled "replacement sheet".
2. Replacement Fig 3 has the reference character 19 removed. Applicant has included corresponding corrections to specification under "Reference Numerals In Drawings" which has the reference numeral 19 removed. The Fig 3 description uses reference numeral 14 and is unchanged and replacement sheets are labeled "replacement sheet".
3. Fig 21 has had their corresponding reference numerals added and replacement sheets are labeled "replacement sheet".
4. Reference character 17 representing 17 linear actuator is changed to:
  - 17A thigh calve and knee linear actuator
  - 17BK back section linear actuator
  - 17B buttocks section linear actuator
  - 17CT coplanar calve/thigh section linear actuator
  - 17K knee linear actuator
  - 17L lumbar linear actuator

Applicant has included corresponding corrections to specification under "Reference Numerals In Drawings" and replacement sheets are labeled "replacement sheet".

5. Drawing reference characters 3 and 2 have been corrected and replacement sheets are labeled "replacement sheet".
6. Drawing reference characters 45 column and 46 column base are clearly shown and described in Fig 15 which shows details of the desk assembly height adjustment mechanism consisting of height

adjustment actuator 52 which actuates column 45 telescopically within column base 46. This mechanism is not shown in other figures such as Fig 1, which shows only column 45.

7. Drawing reference characters 2 and 3 have been corrected and replacement sheets are labeled "replacement sheet".

#### **Claim Rejections-35 USC 112**

8. Linear actuators are well known by persons skilled in the art as devices that move or actuate an object or mechanical part by expanding in a straight length or line and are typically have clevises at both ends. They may be pneumatic cylinders but in bed applications they are typically enclosed threaded rods driven by electric motors. The force, distance and speed are selected for the particular operation to be performed. The application or mechanical configuration is the significant design criteria which is explained by the drawing and description, just as a bolt or motor is well known but it's application is the significant design criteria. There is no relationship between the linear actuators. They simply expand and contract independent of each other, moving the connected mechanism. The bed is shaped to the desired position by an up/down button on a remote for each actuator which moves each section of the bed and is well known among adjustable bed users. The remotes are shown and their use described in Fig 28A-F and in the Operation. The most common bed positions are shown at their ultimate limiting position and any position in between is obtained by stopping the linear actuator.

The linear actuator of Fig 13 is slightly different than the others in that it does not have a cover over the threaded rod. It is described in detail in the Fig 13 description, being made of the components of linear actuator drive motor 40, and threaded rod 33 which is an open thread linear actuator which allows disengagement of the nut 35.

Regardless, the applicant has clarified the drawings and specification to distinguish each linear actuator and has included the name of each actuator in the claims.

**CORRECTIONS TO SPECIFICATION in reference to 9-11:**

Applicant proposes the following amendments to clarify the specification:

**Reference Numerals In Drawings**

- 1 back section
- 2 buttocks section
- 3 thigh section
- 4 calves section
- 5 carriage
- 6 wheel
- 7 track
- 8 mattress
- 9 frame
- 10 pivot fixture
- 11 transfer link
- 12 projection
- 13 stop
- 14 connecting bar
- 15 lock spring
- 16 lower transfer link pivot
- ~~17 linear actuator~~
- 17A thigh calve and knee linear actuator
- 17BK back section linear actuator
- 17B buttocks section linear actuator
- 17CT coplanar calve/thigh section linear actuator
- 17K knee linear actuator
- 17L lumbar linear actuator
- 18 foot end pivot
- 19 connecting bar

**Detailed Description**

In reference to Fig 3;

... While thigh section 3 and calves section 4 are inclined below horizontal, the force of footward motion of the ~~linear actuator 17~~ thigh calve and knee linear actuator 17A on the lower pivot point 16 of transfer link 11 results in... Further footward motion of the ~~linear actuator 17~~ thigh calve and knee linear actuator 17A results....

In reference to Fig 7;

...The lower transfer link pivot 16 is disposed along pivot fixture 10 so that the ~~linear actuator 17~~ thigh calve and knee linear actuator 17A (for the thigh section 3 and calves section ~~2 4~~ which remains inactivated) and buttocks section 2 form....

In reference to Fig 8

...The buttocks section 2 can be can be tilted at any position along track 7 as the ~~linear actuator 17~~ buttocks section linear actuator 17B for the buttocks section 2 reclining...

...crossbar 29 which is pivoted about carriage 5 when ~~linear actuator 17~~ buttocks section linear actuator 17B is retracted....

In reference to Fig 13

Fig 13 - shows the carriage linear actuator ~~17~~ mechanism, for back section reclining....

In reference to Fig 24

Fig 24 - shows a powered back arch support 68 with ~~linear actuator 17~~ lumbar linear actuator 17L.

In reference to Fig 32

...The control of ~~linear actuators 17~~ coplanar calve/thigh section linear actuator 17CT and knee linear actuator 17K ...include attachment points for the ~~linear actuators 17~~ coplanar calve/thigh section linear actuator 17CT and knee linear actuator 17K.

In reference to Fig 28A;

A sensible shape identification control switch for a reclining bed where the control is permanently mounted or hand held, whether the control housing or switch arm 92 has the protrusion 91 represents the pillow or head of a person to sensibly identify the switch for the back section and at the same time identify the orientation of the switch, which in turn identifies the calve/ thigh section as not

having the head, and in the case of this bed, the buttocks section in the middle. The switch arm 92 is pivoted at the pivot point 93 to which the rotation on the switch arm 92 would correspond to the movement of the back section or calves section thigh section reclining direction. Rotating the switch arm in the protrusion direction about the pivot point 93 ~~to which the rotation on the switch arm 92 would correspond to the movement of the back section 1 or calves section 4/ thigh section 3 reclining direction~~ would cause rotation of the represented section to recline pivotably in an upward direction by causing the linear actuator, which moves that section, to extend or retract until switch arm is released or section limit switch for maximum recline was reached by the section.

Rotating the switch arm in the protrusion direction about the pivot point 93 would cause rotation of the represented section to recline pivotably in an upward direction by causing the linear actuator, which moves that section, to extend or retract until switch arm is released or section limit switch for maximum recline was reached by the section.

The button 95 on the protrusion side would correspond to the upward rotation of the section. The calves section and thigh section are operated by the same switch throughout the rotation about the thigh section from feet elevated past horizontal to coplanar calves section and thigh section (leg section) down.

The back arch support button out 97 and back arch support button in 98 would operate the back arch support mechanism 68.

The present specification description explains of the operation of each bed section and it's control, and in conjunction with the amendments to identify the respective linear actuators the movement of each section, the operation of the section in relationship to each other should be understandable. The more complicated movement of the thigh/calve sections using a single linear actuator and transfer link 11, for both coplanar below horizontal and articulated above horizontal, is not claimed in the new claims due to the flexing or lack of rigidity when the bed is horizontal. Whenever the control is viewed by a customer for the first time, they immediately understand the operation of the bed when they play with the control. People familiar

with adjustable beds say this is the easiest controller they have seen, and for a much more complicated bed than what is on the market.

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### Operation

#### Bed positioning-

The switch arm 92 is pivoted at the pivot point 93 to which the rotation on the switch arm 92 would correspond to the movement of the back section or calves section thigh section reclining direction. Rotating the switch arm in the protrusion direction about the pivot point 93 would cause rotation of the represented section to recline pivotably in an upward direction by causing the linear actuator which moves that section to extend or retract until switch arm is released or section limit switch for maximum recline was reached by the section. The button 95 on the protrusion side would correspond to the upward rotation of the section. The calves section and thigh section are operated by the same switch throughout the rotation about the thigh section from feet elevated past horizontal to coplanar calves section and thigh section (leg section) down.

The back arch support button out 97 and back arch support button in 98 would operate the back arch support mechanism 68. For instance, the switch arm 92 on the control housing 94 having, protrusion 91 which represents a pillow, is pushed upward to cause the back section linear actuator 17BK to retract, pulling the carriage 5 headward which causes the back bar 24 to elevate the back section 1 until the switch arm 92 is released. To lower the back section, the switch arm 92 is pushed downward to cause the back section linear actuator 17BK to expand pushing the carriage 5 footward which causes the back bar 24 to lower the back section 1 until the switch arm 92 is released. The back section linear actuator 17BK will automatically stop when either end of it's stroke is reached. This operation is similar for the other linear actuators and their corresponding sections that they move.

The arm rests 44 adjusts for width and tilt and fold out of way when unlocked and rotated horizontally about arm rest folding swivel 77 when the desk is used as side table or end table. The arm rests are locked into the sitting position for entry and exit. To use the desk assembly to enter the bed, for a person requiring maximum support, the person would maneuver their wheel chair to the bedside near the thigh section 3 and calves section 4 pivot edge, facing the feet end of the bed, and then swing the desk assembly over their wheel chair. The buttocks sling 50 should already be under their buttocks in the wheelchair from their initial entrance, if not then it should be positioned under them. The ends of the buttocks sling 50 and back sling 51 are secured onto the arm rests 44 and the upward force of the height adjustment actuator will lift the person out of the wheel chair. The wheel chair is rolled out from under them and the swivel lock release button 79

pushed and locked "on" so that both hands and feet may be used to maneuver one's self and desk assembly into center of the mattress with the buttocks section 2 horizontal, and the back section 1 reclined. (The calves section 4 and thigh section 3 may be up but preferably down). The buttocks section 2 is tilted upward by activating the back section lever or push button lifting the person and slackening the buttocks sling 50 ends which are then unsecured and then back sling 51 unsecured. The slings may be left in place for future exit of bed, which is the reverse of entering.

To use the desk assembly to enter the bed, for a person requiring partial support, the person would position oneself between the armrests (buttocks sling 50 and back sling 51 may also be secured at this point if needed) and hold the two hand grips 78. The swivel lock release buttons may be configured to release one or more of the swivel locks 47. Both buttons have to be pushed in three depths to fully release all the swivel locks 47 allowing the person to maneuver body and desk assembly to the bedside near the thigh section and calves section pivot edge, facing away from the bed, with the buttocks section 2 horizontal, and the back section 1 reclined. (The calves section 4 and thigh section 3 may be up but preferably down). The buttocks section 1 is tilted by activating the back buttocks section lever or push button lifting the person from their feet while the swivel locks are locked to allow stability.

The person then can shift their body weight and buttocks by resting it on their elbows and forearms on the armrest 44, and sliding their buttocks towards the center of the mattress as far as they can by using their legs and feet to push on the foot rest and the mattress. The swivel locks are then released and the desk assembly positioned further towards the center of the bed and then locked again. This procedure is repeated until they are in position. The buttocks section 2 or the height adjustment actuator 52 can also be lowered and raised to assist in shifting the body weight to the elbows and forearms. A powered rotary actuator can be added to the swivel locks 47 to assist in the horizontal movements, but is not preferred due to low resistance of the ball bearings, complexity and cost, but for a person with weak arms and without the use of their lower body, it may be essential and offered as an option.

12. Claims 1-106 have been cancelled and new claims 107-128 include corrections to particularly point out and distinctly claim the subject matter.

**Response to Office Action 35 U.S.C. 102 Rejection;**

Claims 50-106, and 102 have been rejected under 35 USC 102 (b) as being anticipated by Gaffney (E.P. 1092371). It is the Examiner's position that the document discloses a multi-position reclining bed having the elements of the applicant's claimed bed. Applicant respectfully disagrees.

The chair of Gaffney is clearly a reclining chair and not a bed and has the following structural and functional differences with the applicant's bed:

1. Gaffney's chair has permanent armrests which requires forward entry and exit (even without armrests) - a bed is entered and exited from the side as is applicant's bed. Gaffney chair will not allow side entry and exit.
2. Gaffney's chair will not lie with his sections flat in a horizontal plane- applicant's bed forms a flat horizontal plane. All beds sold as beds are able to form a flat horizontal sleeping surface even if there was a bed the same width as Gaffney's chair. This would be the major defining feature between a bed and a chair.



3. Gaffney's chair is a standard chair width as determined by the armrests and will not allow a person to roll from side to back to other side- applicant's armrests swing into position for sitting and are moved to the side for sleeping to provide a standard width bed to allow rolling of person from side to back to other side.
4. Gaffney's non-level surface will not allow comfortable side sleeping even if the person were to lift and lower themselves onto their side.
5. Gaffney's chair is the length of a standard reclining chair of 64 inches to allow the leg section to incline to a vertical position, resulting in the average height person's feet to hang over the foot rest when reclined- the applicant's bed is a standard bed length of 80 inches to allow the feet to be supported when horizontal resulting in the leg section not being able to be inclined to a vertical position.
6. The length of Gaffney's chair makes it simple to fold the chair sections into a reclined configuration- applicant's full length (twin extra long) requires a track with a cantilever supporting leg and a buttocks section that must first be tilted upwards to provide clearance for the coplanar thigh/calve section to be lowered for sitting.
7. Most reclining bed are extra long to compensate for reduction in mattress length as it shortened by the folds in the mattress compressing, not stretching, the mattress materials.

8. Gaffney's chair has attached cushions- applicant's bed has a standard detached mattress.
9. Gaffney's sitting cushions has gaps between them when in it's most reclined horizontal position- applicants mattress forms a one piece uniform sleep surface.
10. Gaffney's cushion are not thick enough to allow sufficient contouring around shoulders and hips when lying on their side, and is designed for back lying, which requires less thickness- applicant has a conventional mattress designed for side sleeping.
11. Gaffney's chair cannot be fitted with sheets or blankets due to the armrests, and sheets and or blanket placed on this chair would drape over the armrests or hang down along sides of chair- applicant's bed uses standard sheets and blankets that are tucked in between base and mattress to secure them.
12. Gaffney's chair uses structural arms with pivots to achieve movement but not tracks with wheels -applicant's and all other all adjustable beds have tracks and wheels to allow their sections to lay flat.
13. Gaffney's chair cannot elevate feet above the person's head, applicant's and all other adjustable beds raise the person's feet above the person's head while they lie with their back horizontal.
14. Gaffney's chair has one motor that moves the sections into standard reclining chair configuration as it reclines which is determined by the

linkage- applicant's bed has 4 motors that adjust each section to the desired position independent of the other sections. Most adjustable beds have 2 motors to adjust the back and leg sections.

15. Gaffney has a chair with armrests, as all reclining chairs have, that reclines for resting or short naps on a person's back- the applicant has a bed for full night sleeping that is turned into a chair by dropping the legs, tilting the buttocks, raising the back and swinging in armrests.

16. When Gaffney's chair is fully reclined and a person sits on the foot end, the head end of the chair will lift and topple footward- applicant's bed has a much longer leg section than Gaffney and a claimed cantilever leg to prevent toppling

17. All chairs, including Gaffney's, are made to have the person's feet rest on the floor, except bar stools (which add a foot rest). The applicant's bed has a novel added foot rest for the reason of turning it into a chair. Without this feature, the person's feet would not be supported, to ergonomically simulate the support of the legs on a floor allowing a person to sit long term since the leg weight must be supported and it also to allows the person to shift their body weight for comfort.

The above reasons clearly distinguish that Gaffney's invention is a recliner chair /lift chair, and the applicant's invention is an adjustable full sit up bed. It is also clear that Gaffney's chair does not provide the utility functions of a

bed and is inoperable as a sleeping bed. (ie people can sleep in a hammock, chair, stool, bench or floor, but it does not make these a bed.

The limitations of claim 102 “A multi-position reclining bed”, and “horizontally situated elongated track” and “a thigh/calve section” clearly distinguish over Gaffney’s chair. The limitation “multi-position” implies various positions of the sections relative to each other. Gaffney’s chair has 2 positions; sitting up chair or reclined chair. His lack of a “horizontally situated track” as claimed by the applicant, not only distinguishes over Gaffney but provides the structure to allow multi-positioning. It allows the bed to lay flat and horizontal hence making it into a sleeping bed surface. Gaffney’s structure, comprising linkage arms, limits the relative movement of the chair sections in a fixed configuration relative to each other as it goes from sitting to reclined.

The applicant’s limitation “thigh/calve section” distinguish over Gaffney’s chair, which has a single section for the legs and one for the buttocks, whereas applicant has 2 sections for the legs and one for the buttocks.

Applicant has a two part thigh /calve section which raises above (articulated) and coplanar below the horizontal plane of the buttocks section in a downward direction pivotally about an adjoining edge with the buttocks section.

The applicant’s new limitation in claim 107 “ d. a mattress that rests on said plurality of supporting elements” clearly distinguishes applicant’s bed over Gaffney’s chair.

It would not be obvious to anyone skilled in the art to use Gaffney's chair as a bed since it's main purpose is for sitting and lifting a person to a standing height. Gaffney used the concept of wallhugger, which is well known with adjustable beds and adapted this to his lift chair. Had Gaffney deemed the chair for sleeping purposes and made it larger he would have to make the many above structural changes resulting, when in the lifted position, in a unstable lift chair and would not allow the person to exit the foot of the bed by sliding down the leg section which is about 12" longer than the person's legs. This would make Gaffney's bed inoperable as a lift chair for which it was designed. If he removed the arm rests to allow side exit it would make his chair inoperable for long term sitting. If he made the chair wider for rolling a person's body from side to back to other side, it also make the chair inoperable for long term sitting which requires arm rests to partially support the upper body weight. ( this is readily felt if one sits in the middle of the back seat of a car without armrests for even short trips)

Hence anyone skilled in the art would have armrests on a recliner chair, and a flat horizontal mattress of at least 36 inches wide and adult body length in order to make a bed for sleeping. The dimensions of Gaffney's chair and applicant's bed are clearly depicted by the general shape to conform to the average adult height, without setting forth dimensional limitations.

A person skilled in the art would not construe Gaffney's chair much larger than depicted, say for an 8 foot tall person, nor applicant's bed as a child size bed, but rather as conventional in size for a chair and for a bed.

## **SUMMARY**

Applicant has amended the claims to overcome the Objections of the examiner, and presented arguments to delineate the present invention from the device shown in the prior art. It is respectfully submitted that the claims are in condition for allowance, such action is respectfully requested. If, for any reason

this application is not believed to be in full condition for allowance, applicant respectfully requests the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. 2173.02 and 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Respectfully submitted,



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